Recd 25 Nov 64

PAR 233

Proj #5050

ZOOM (6X to 60X) PROJECTION LENS
FOR
MONOCHROMATIC LIGHT

8 Oct 1964

PROJECTION AUTHORIZATION REQUEST

PAR 233
8 Oct 64

SUBJECT: Zoom (6X to 60X) Projection Lens for Monochromatic Light

TASK/PROBLEM

1. Investigate the possibility of designing a 6X to 60X Zoom Projection Lens for Monochromatic Light.

PROPOSAL

2. A need is expected for a monochromatic zoom lens for rear projection film viewing. The need will arise from development effort, sponsored by the customer in another company, upon a near-ultraviolet-sensitive light amplifier screen. Parameters for the proposed lens design are:

a. Screen size to be 30 inches square.

b. Film gate size to be 5 inches square.

c. Lens system to zoom at ratio of 10 to 1. Magnifications to range from 6X to 60X.

d. Radial distortion shall be low enough that it is not subjectively obvious in viewing a stationary image on the screen.

e. Lens aperture shall be fixed in size and position throughout the zoom range.

f. Desired goal for resolution to be 10 l/mm per power. The projection field is to be flat so that the minimum resolution over the entire field will not be less than 6 l/mm per power.

g. Spectral zone is the near ultraviolet 3500A to 4000A band.

3. These parameters have been discussed with a lens designer in the contractor's organization who has much experience with zoom lens design for camera objectives, etc. His comment was that zoom systems with a 10:1 magnification range have been designed and the restriction of wavelength range might improve the image quality to the required level. An actual design program would be necessary to learn what levels of distortion and image quality could be achieved.

4. Enlarged computer facilities have been installed in the contractor's plant and an "automatic" design program for variable focus lenses is being written and is expected to be available about February 65. This design program would be very useful in exploring the proposed 10:1 zoom lens system.

5. It appears that for a definite amount of effort, the feasibility of achieving the required image quality can be determined. The likelihood of achieving the required quality cannot be predicted before completion of such a study.

6. Evaluation of the success of the design will be upon theoretical consideration of the computation results. Fabrication of samples of a successful design will be done on a subsequent project.

PROGRAM OBJECTIVES

7. Program objectives are:

a. Investigate, by design, computations and theoretical considerations of computation results, the feasibility of a 6X to 60X Zoom Projection Lens with the desired image quality and distortion level.

b. Furnish a final report with conclusions and recommendations.

SCHEDULE

8. A tentative schedule covering major items of effort is shown in Figure 1. The time span indicated to complete the subject program is based on actual start of work. Upon approval to proceed and/or start of work, schedule will be reviewed and necessary changes reported as required. The tentative schedule is based on the assumption of starting work on or after 1 March 1965 -- the approximate date of computer program availability.

Tentative Schedule

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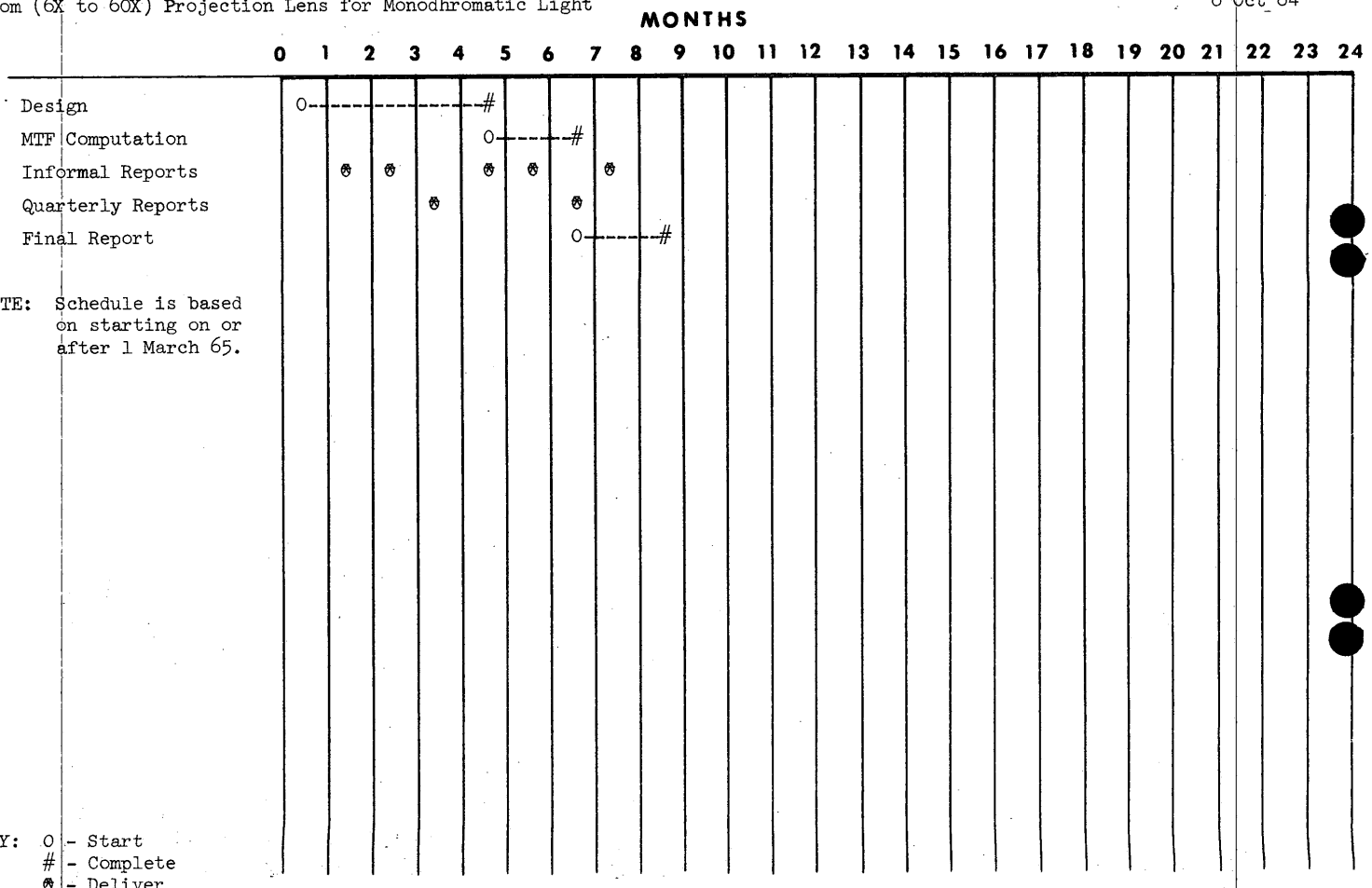

NOTE: Schedule is based on starting on or after 1 March 65.

KEY: O - Start
- Complete
@ - Deliver